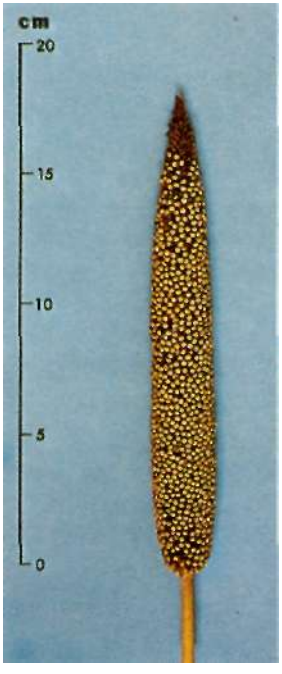
Pearl Millet Male-Sterile Line ICMA 3

and its Maintainer Line ICMB 3



- **A d_2 gene dwarf (ca 1 m)**
- **Matures early (ca 49 days to flowering)**
- **Has large grains (ca 12 g 1000^{-1})**
- **Has good general combining ability**
- **Can be used to produce short and tall hybrids**

ICRISAT

Plant Material Description no. 6

International Crops Research Institute for the Semi-Arid Tropics
Patancheru P.O., Andhra Pradesh 502 324, India

1985

Purpose of Description

ICMA 3 and ICMB 3 (designated as AKM 2221-26-1 and BKM 2221-26-1 by Kansas State University) were jointly issued for breeders' use by Kansas State University and ICRISAT. The All India Coordinated Millets Improvement Project recommended these lines in 1984 for large-scale distribution and utilization in the production of experimental hybrids.

Origin and Development

Seed stocks (designated as AKM 2221 and BKM 2221, respectively) were obtained from Fort Hays Branch Experiment Station, Kansas State University, USA. The maintainer line was derived by crossing Tift 23DB with PI 185642. Tift 23DB is a maintainer line of Tift 23DA developed at Tifton in Georgia, USA. PI 185642 was collected in 1949 from a market in Kumasi, Ghana, and supplied by the Southern Region, Plant Introduction Experiment Station, Georgia, in 1971. AKM 2221 was derived by backcrossing the maintainer line four times into the cytoplasm of Tift 23DA with continuing pedigree selection. ICMA 3 and ICMB 3 were reselected for downy mildew resistance in the downy mildew nursery at ICRISAT Center following two generations of plant(A) x plant(B) crossing and pedigree selection.

Synonyms. 1A/1B; 842A/842B; AKB 2221-26-1/BKM 2221-26-1.

Performance

Parental lines. The expression of male-sterility of ICMA 3 has remained stable over sites and seasons with good seed-set under open pollination. ICMB 3 is a good pollen-shedder but suffers from very poor seed-set under bagging. About 5% downy mildew has been observed in ICMA 3 and ICMB 3 (as compared with 55-75% in the susceptible check, hybrid NHB 3) in the downy mildew disease nursery at ICRISAT Center. It is as susceptible to ergot and smut as the released and widely used male-sterile lines 5141A and 111A.

Hybrids. In a preliminary yield trial (Trial I) ICMA 3 hybrids yielded over 10% more than 5141A hybrids, and the best hybrid on ICMA 3 yielded more than the best plot of highest-yielding check hybrid MBH 110 (Table 1). In a second preliminary yield trial (Trial II), ICMA 3 hybrids on average yielded 24% less than MBH 110 and the best hybrid on ICMA 3 also yielded about 6% less than the highest-yielding plot of MBH 110. In both the trials, however, ICMA 3 hybrids yielded much more than the widely cultivated commercial

hybrid BJ 104. In both trials, ICMA 3 hybrids flowered about 5 days earlier and were about 40 cm shorter than MBH 110. Being a d_2 gene dwarf, ICMA 3 provides an opportunity for breeders to produce hybrids with a wide height range.

Table 1. Grain yields (kg ha^{-1}) of ICMA 3 hybrids at Hisar, rainy season 1983.

	Trial I[1]		Trial IP	
Hybrids	Mean	Range	Mean	Range
ICMA 3 hybrids	2240	1690-3230	2770	1490-4370
5141A hybrids	2040	1490-3150	nd	nd
MBH 110 (check)	2431	1770-2970	3650	2610-4630
BJ 104 (check)	1480	950 1760	2280	1280-2720

1. Mean of 18 hybrids on each A line. Three repeat plots of each check in each of the three replications.
2. Mean of 49 hybrids on each A line. Four repeat plots of each check in each of the three replications.

Table 2. Morphological characters of male-sterile line ICMA 3, ICRISAT Center, dry (summer) season 1984.

Character	5141A (check)	ICMA 3
Time to 50% bloom (d)	51	49
Plant height (cm)	85	102
Head length (cm)	15	16
Head girth (cm)	5.2	6.8
Effective tillers/plant	4.0	2.1
1000-grain mass (g)	6.3	11.7

Plant Characters

ICMA 3 and ICMB 3 are d_2 gene dwarfs, and about 100 cm in height (Table 2). Both lines flower simultaneously and are medium-early in maturity. These lines have shy tillering and, among the tillers, flowering is nonsynchronous.

Foliage remains dark green until maturity. Heads are about 15 cm long, well exserted, and taper towards the tip.

Seed Characters

The grain is bold, 12 g 1000^{-1}, hexagonal-globular, and light gray in color.

Plant Material Descriptions from ICRISAT

Leaflets in this series provide brief descriptions of crop genotypes identified or developed by ICRISAT, including:

- germplasm accessions with important agronomic or resistance attributes;
- breeding materials, both segregating and stabilized, with unique character combinations; and
- cultivars that have been released for cultivation.

These descriptions announce the availability of plant material, primarily for the benefit of the Institute's cooperators. Their purpose is to facilitate the identification of cultivars and lines and promote their wide utilization. Requests should be addressed to the Director General, ICRISAT, or to appropriate seed suppliers. Stocks for research use issued by ICRISAT are sent to cooperators and other users free of charge.

ICRISAT is a nonprofit scientific educational institute receiving support from donors through the Consultative Group on International Agricultural Research. Its major mandate is to serve as a world center for the improvement of grain yield and quality of sorghum, millet, chickpea, pigeonpea, and groundnut, and to act as a world repository for the genetic resources of these crops. The plant materials announced in these leaflets are end-products of this work, which is aimed at enhancing the agricultural productivity of resource-poor farmers throughout the semi-arid tropics.

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